



MISSION STATUS BULLETIN

VOYAGER

November 7, 1977



No. 11

SUMMARY

Voyager 1 is over 59 million kilometers (36 million miles) from Earth, steadily closing the gap between itself and its sister ship. At the speed of light (300,000 kilometers or 186,000 miles per second), one-way communication time is about 3 minutes. The second trajectory correction maneuver was executed on October 29.

Voyager 2 is over 64 million kilometers (40 million miles) from Earth. One-way communication time is about 3-1/2 minutes. At Jupiter, this will stretch to about 38 minutes, and to 85 minutes at Saturn.

In less than a month, both spacecraft will cross the orbit of Mars, half an AU (astronomical unit) beyond Earth. At this point, Voyager 1 will pass Mars from about 139 million kilometers (86 million miles), and Voyager 2 will pass 137 million kilometers (85 million miles) from Mars.

As they leave the realm of the terrestrial planets, headed for the outer planets, the Voyagers will soon be entering the asteroid belt which lies between the orbits of Mars and Jupiter.

UPDATE

Voyager 1

Voyager 1's second trajectory correction maneuver, to "clean-up" small flight path inaccuracies, was executed on October 29. Pointing inaccuracies and undervelocity resulting during the first trajectory maneuver on September 11 and 13 were accounted for in the sequence.

Other recent spacecraft activities have included magnetometer, photopolarimeter, and plasma instrument calibrations, radio frequency subsystem (RFS) tests, and tests of the RFS tracking loop capacitor.

Voyager 2

On October 31, Voyager 2 was rotated to acquire the star Deneb as a celestial reference point. This position will allow earlier Earth-acquisition during high-gain antenna Earth-pointing maneuvers required during playbacks and other sequences.

Studies of the fuel budget and the effect of acquiring Deneb as a gas-savings tactic are continuing.

Voyager 2's first trajectory correction maneuver on October 11 slightly adjusted the aiming point for the Jovian satellite Ganymede. Voyager 2's closest approach to Ganymede is now planned for about 60,000 kilometers (37,000 miles) rather than 55,000 kilometers (34,000 miles) on July 9, 1979.

In addition, the post-Jupiter trajectory correction maneuver to Saturn has been rescheduled for 11 days after Jupiter closest approach (J+11 days) from the previously planned J+70 days. In combination with the Ganymede aiming point adjustment, a total hydrazine savings of approximately 8.6 kilograms (19 pounds) will result.

An apparent failure of the low-energy charged particle (LECP) instrument stepper motor is being investigated.

MISSION HIGHLIGHTS

Comet Kohler

No attempt will be made to observe the comet Kohler, as further studies have determined that damage to the optics of the imaging cameras would be probable.

Observation of the comet would require turning the spacecraft to a position which would place the cameras too near a direct line to the Sun for too long a period, causing probable damage to the vidicons.

Weilheim Tracking

Tracking by the Helios Project at the station in Weilheim, Germany, continues. Studies aimed at improving the data quality are underway. The unique radial alignment of the Sun, Helios, Earth, and Voyager will exist for several months.

NASA

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Visit by Prince Charles

Prince Charles of Wales visited the Jet Propulsion Laboratory on October 27, at his request. After viewing full-scale models of the Viking Mars Lander and the Voyager spacecraft, and visiting the Mission Control and Computing Center, the prince moved to the Voyager Mission Operations area, where he sent a command to Voyager 1, some 46 million kilometers (29 million miles) distant.

From the command console, the prince spoke by telephone with operators of the NASA/JPL Deep Space Station near Canberra, Australia, advising them that the command had been prepared and determining that the ground station transmitter modulation was on and "go for commanding."



Prince Charles checks with tracking station operators in Australia prior to sending a command to the Jupiter-bound Voyager 1 spacecraft on October 27. With the prince in the Voyager Mission Control Center is JPL Director Dr. Bruce C. Murray.

The prince pressed the command switch, sending DC-2A, Voyager's "ranging on" command, through the Australian station and up to the spacecraft.

At the speed of light, the signal reached Voyager 1 in 2½ minutes. In another 2½ minutes, acknowledgement that the spacecraft had received and acted upon the command was received on the ground and immediately printed out on a telemetry display at Prince Charles' console.

The DC-2A commands the spacecraft to allow the tracking stations of the Deep Space Network to determine precisely the distance, or range, to the Voyager by establishing a special closed-loop code between the ground and the spacecraft.



Prince Charles reaches for button to send the command 29 million miles to Voyager 1. With him at the command console at JPL are Michael Devirian (back to camera) Voyager spaceflight operations director, and Evelyn Davis, command console operator. Partially hidden from view at left is John R. Casani, Voyager project manager. At far right, JPL Deputy Director C. H. Terhune, Jr.